DISPLAY CARRIER AND ELECTRONIC DISPLAY CONTROL FOR MULTIPLE DISPLAYS IN A PORTABLE ELECTRONIC DEVICE

FIELD OF THE INVENTION

The present invention pertains to a plurality of displays in association with a portable electronic device. More particularly, this invention pertains to the plurality of displays and the electronic control of the plurality of displays using a semiconductor management chip.

BACKGROUND OF THE INVENTION

Portable electronics equipment, such as radios, cellular and cordless telephones, pagers and the like, are becoming increasingly popular. In many instances it is desirable to provide apparatus on the equipment to supply the operator with visual messages that include graphics and printed information as well as a means to access and manipulate such messages. The problem is that prior art apparatus providing these functions require relatively high electrical power and require a great amount of area to be sufficiently large to produce useful and visually perceivable information.

In the prior art, for example, it is common to provide visual apparatus utilizing liquid crystals, directly viewed light emitting diodes, etc. These produce very large and cumbersome displays that greatly increase the size of the receiver and require relatively large amounts of power.

Apparatus incorporating a miniature virtual image, which solves most of the problems mentioned above, is disclosed, for example, in U.S. Pat. No. 5,224,198, entitled "WAVEGUIDE VIRTUAL IMAGE DISPLAY", issued Jun. 29, 1993. Typically, the products in which the miniature virtual image display is incorporated are small handheld devices.

Typically, in portable electronics equipment, such as radios, cellular and cordless telephone.,, pagers and the like, there exists a small display which illustrates the number being dialed or the function being programmed. Greater capabilities in terms of displayed information can be achieved by adding an additional display or displays to the portable electronics equipment. Of concern is the positioning of these additional displays and the considerable power required for the display module and associated electronics.

Therefore, there exists a need to provide for a detachable display carrier that has loused therein a plurality of displays, that in combination with an electronic display control provides for lower power drain on a power source of a portable electronic device.

Accordingly, it is a purpose of the present invention to provide for a display carrier including an electronic display control for management of a plurality of displays housed in the display carrier, the display carrier and the electronic display control utilized in conjunction with an existing portable electronic device.

It is also a purpose of the present invention to provide for a display management chip for electronic display control of a plurality of displays utilized in conjunction with an existing portable electronic device.

It is a further purpose of the present invention to provide for a new and improved electronic display control of a plurality of displays of a portable electronic device, which enables the plurality of displays and thus data contained within the product to be accessed and thus viewable by the user with lower power drain to the power source.

SUMMARY OF THE INVENTION

The above problems and others are at least partially solved and the above purposes and others are realized in a portable electronic device including a display carrier having housed therein a plurality of displays and an electronic display control. The electronic display control is operational to control the plurality of displays housed within the display carrier dependent upon power source, thus permitting the conservation of power consumption.

BRIEF DESCRIPTION OF THE DRAWINGS

The novel features believed characteristic of the invention are set forth in the claims. The invention itself, however, as well as other features and advantages thereof will be best understood by reference to detailed descriptions which follow, when read in conjunction with the accompanying drawings, wherein:

FIG. **1** is a simplified schematic view of a portable electronic device with a detachable display carrier according to the present invention;

FIG. **2** is a simplified schematic cross-sectional view taken through line **2**—**2** of FIG. **1** illustrating the display carrier and plurality of displays of the present invention; and

FIG. **3** is a simplified block diagram of the electronics associated with the detachable display carrier with electronic display control for use with a portable electronic device according to the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring specifically to FIG. **1**, illustrated in simplified schematic view is a portable electronic device **10** with a power source **12**, more particularly a battery, and further illustrating the attachment of a display carrier **14** detachably positioned on portable electronic device **10**. In this particular embodiment, portable electronic device **10** is generally illustrated as a portable communications device, such as a cellular telephone, but may include any type of portable electronics equipment, or portable/handheld communication receiver, including a pager, two-way radio, or a transceiving device such as a portable telephone, or the like. Portable electronic device **10** is fabricated having hinged first major portion **16** and second major portion **18**. First major portion **16** and second major portion **18** are hingeably attached so as to allow for the positioning of first major portion **16** and second major portion **18** on top of each other when portable electronic device **10** is in a closed or non-operational position. Display carrier **14** includes in this particular embodiment a plurality of display apparatus **15** for viewing displayed images. More particularly, display carrier **14** includes a virtual display **24**, a large direct view display **26**, and a small direct view display **28**. It should be understood that any combination of displays **24**, **26** and **28** can be included dependent upon the specific application for display carrier **14**, more particularly portable electronic device **10**.

As illustrated in FIG. **1**, there is positioned on a rear side of first major portion **16** of portable electronic device **10**, battery **12** in electrical interface with portable electronic device **10**. Battery **12** provides power to portable electronic device **10** during portable usage. It should additionally be understood that there is provided on portable electronic device **10** a receptacle (not shown) for operation of portable electronic device **10** with a hardwired power source such as an AC/DC power source

Display carrier **14** is detachably mounted to portable electronic device **10** utilizing snap-fit connections **20** (as